/ATTENTION TO RADIO ADVERTISEMENTS/: AN APPLICATION OF SELECTIVE ATTENTION THEORY

by

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DEDICATION

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The experience of a radio playing as a background auditory stimulus to other activities is a common occurrence. In fact, radio, of the three major media, is unique in that, by involving only auditory perception, it allows for more diversity in accompanying activities than does either print or television. Many environments in daily life provide the settings for the background of a radio broadcast (shopping malls, grocery stores, elevators, business and professional offices, restaurants, cars). This aspect is great for listeners who enjoy doing other activities with the radio on, but it can raise important questions in the minds of advertisers and researchers desiring to know how or if specific messages are attended to over the radio in such contexts.

One question which might be asked is whether information heard over the radio has more impact, or is better recalled, than information through other media. In other words, does this unique quality of radio, as opposed to the other media, enhance or inhibit perception and comprehension of information? Another related question is whether it is even possible to attend to two different activities (radio listening and some other activity) simultaneously. The area of cognitive research which seeks to understand the processes of attention and information processing should certainly be relevant to the issue of attention to advertising heard over a radio. A major

interest of a radio advertiser is how a message can compete with all the other incoming stimuli and still influence the listener. All of these issues above demonstrate the need for a broader understanding and application of research in attention to radio advertisements.

The present research attempted to address the above issues by combining two quite distinct areas of research: research on the effectiveness of the different media to convey a certain message, and research on selective attention with a focus on the unattended stimuli. In combining these areas, the present studies speak to particular weaknesses in both areas and try to provide insight through a fresh line of research.

Media Research

Given the diversity of uses of media, several researchers have addressed the issue of which modality is most effective for the processing of information. Chaiken and Eagly (1976, 1983) used persuasive messages presented through different media (print, audio and audio-visual) and manipulated such things as message difficulty (1976) and communicator salience (1983) to see if modality would influence comprehension and opinion of the message. McConnell (1970) adapted three television advertisements to print and radio and tested for recall immediately following presentation and for several weeks afterward, having repeated the presentation twice more during the testing

intervals. Wilson (1974) used the length and degree of interest of news stories to determine which medium was better recalled than the others. Klein (1981) applied two different theoretical orientations to explain the influence that the three media had on recall of six advertisements presented in a certain audio, audio-visual or print program.

The conclusions of these studies were not consistent with regard to the modality issue. Print messages containing more difficult material were found to be more persuasive and better comprehended than were audio and audio-visual. No differences in comprehension were found with less difficult material, although audio-visual messages were found to be more persuasive than either print or audio-only (Chaiken & Eagly, 1976). Communicator salience was more pertinent and had a greater impact on opinions with both audio and audio-visual messages than with print (Chaiken & Eagly, 1983). Wilson (1974) found recall significantly better with print than with either radio or television; however, there was no support for any differences between media message recall with McConnell's (1970) study. Klein (1981) found that television produced significantly poorer recall than either radio or print and, overall, radio had a higher average recall than the other two media, although this difference was not significant.

The above studies demonstrate the difficulties of trying to compare the different types of media on various

measures. Support for the effectiveness of information processing of one medium over another is relative, depending on what measure is used and how the study is done. More specifically, it has been mentioned that these studies using forced-exposure techniques do not adequately depict real-world situations, especially in relation to radio (Klein, 1981; Jacoby, Hoyer & Zimmer, 1983). Radio, as noted above, commonly serves as background to other activities, not as the main focus of attention, as all of the above studies have presented it. Therefore, more appropriate to the study of radio listening would be to involve the radio as background while doing some other task. Along this line of thinking, research in selective attention, where common research tasks are to attend to the input in one perceptual channel while input to another channel is not attended to fully, may provide insight into the radio-as-background situation.

Selective Attention

Selective attention and radio listening both involve, or at least attempt to involve, the ability to process two or more perceptual inputs simultaneously. Broadbent (1958) is often cited as initiating much of the research in selective attention, having articulated the first complete theory of attention, known as the filter model. He proposed a model where incoming sensory stimuli would be dealt with by a limited capacity processor one channel at a time and

that the individual selects or filters what enters this processor, based on various physical characteristics of the stimuli. The individual is able to shift back and forth between various inputs with the help of a short-term store which contains input from the immediate past history of unselected channels (Norman, 1969).

Broadbent's work and work by others on selective attention vary little with the specific techniques they use in their research. The most prevalent technique is the dichotic listening task where different messages are presented through earphones to subjects. Often the task would be to "shadow" audibly one message coming in one ear while another message, signal, or word is channeled through the "unattended" ear. Treisman (1969) suggested two specific ways in which selective attention could be studied: through divided attention or focused attention. Divided attention involves dividing one's attention between two or more stimuli, whereas focused attention involves selecting one channel to focus one's attention on and rejecting all other inputs. All of the following studies use one form or variation of these dichotic listening tasks.

Treisman (1969), in a review of selective attention research, modified and extended Broadbent's filter model. She noted there were at least four types of attention strategies that could be distinguished in the research. Briefly, these strategies restrict the number of inputs

analyzed, the dimensions analyzed, and the items for which a subject looks or listens and then selects the results of the perceptual analysis which will control behavior and be stored in memory. Each of these operate in different stages of the attentional process, which led Treisman to conclude that either completely and equally dividing attention or completely and exclusively focussing attention are difficult, if not impossible. Her own research supported this to the extent that irrelevant or ignored stimuli were found to interfere with the selective attention process (Treisman, 1964a, b, 1965). Thus, it would appear possible that radio as a background or nonattended stimuli could interfere with or influence the selective attention process to some degree.

Moray (1975) and Broadbent (1982), in more recent reviews of selective attention research, have concluded that there are few substantial findings which even mildly disagree with the basic findings of Treisman and Broadbent. They both imply that recent research is more elaborative and extensive than in the past, but it does not involve any major contrasting paradigms. However, it is recognised that differing theories exist (Deutsch & Deutsch, 1963; Reynolds, 1964; Egeth, 1967; Neisser, 1967). Moray (1969), in summarizing these theories, observes that most still owe their foundations to Broadbent (1958) and that basically they are modifications or revisions of certain

aspects of his model. Schneider and Shiffrin (1977) have developed the most current revision of Broadbent's model, making it more precise and complex. They introduce the concepts of automatic and controlled processing to describe where and how incoming stimuli are processed. Automatic processing of incoming information is done in a parallel manner with little effort (e.g., listening to the radio while doing another task), whereas controlled processing is performed serially with conscious effort given to a processing task (e.g., reading a book with the radio played as background stimuli). The present studies, as described later, focussed on the controlled processing of information while a radio program was being played in the background.

Unattended Stimuli

Although much of the selective attention research has been devoted to a variety of investigations of when and where such "filtering" takes place, the question raised in the present experiments is how or under what conditions does the ability to recall unattended auditory stimuli occur. The research on unattended auditory stimuli is relevant to the experience of radio perception, especially radio advertising perception, in that the main focus of attention is directed toward other sensory stimuli. Early studies demonstrated that recall or response to verbal content of an unattended message as very limited at best (Cherry, 1953; Treisman & Geffen, 1967; Moray, 1959). However,

interference did occur from unattended messages (Treisman 1964a, b, 1965). In order to understand what was "breaking through" unattended auditory stimuli, Eriksen and Johnson (1964) had a small sample of subjects read a novel while a tone was transmitted via earphones at random intervals. An alerting stimulus was also transmitted after the tone and subjects were to estimate whether there was a tone within the previous 10-15 seconds. They found the unattended tone was remembered longer after the delay than expected. They also discovered that the best detection was when the subjects were asked immediately after the tone, with a longer delay from the tone increasingly less likely to give the correct detection response.

Norman (1969) had subjects shadow English words presented in one ear and tested for memory for two-digit numbers presented in the unattended ear. He found similar results to Eriksen and Johnson (1964), in that subjects had a memory for digits when asked immediately after the digit presentation, but no memory for digits after a 20-second delay. Norman proposed that the verbal material in the unattended ear was processed in short-term memory but not transferred to long-term memory. An implication might be that radio information is soon forgotten as well if not transferred to long-term memory.

In a more complex dichotic listening task, Glucksberg and Cowen (1970) had subjects shadow prose in one ear and

test for recall of single digits embedded in prose in the unattended ear. They found that digit recall decreased as delay between testing increased, consistent with the above studies. They proposed that simple verbal material could be stored for no longer than 4-5 seconds in the unattended channel. Furthermore, they concluded that memory for unattended auditory stimuli was based only on the sensory features of the stimuli, not the categorical features.

These studies definitely support the hypothesis that all incoming information undergoes at least some processing, if only on a sensory level. Weaknesses in these studies relate to their use of rather unmeaningful, simple, unattended target stimuli such as tones and digits. Although it can be stated that unattended stimuli do "break through" to at least minimal attention, to make the assumption that complex messages can be recalled would not necessarily be supported by these above studies. The question still remains as to whether more complex or meaningful stimuli, such as radio advertisements, could be perceived and recalled or be otherwise influential, given that attention is divided or focused on other stimuli. This question, then, directs the present research to involve more meaningful stimuli, as in a commercial message broadcast over a radio.

Meaningful Unattended Stimuli

It has been suggested that unattended messages could "break through" if they were either highly probable in the context of the attended message or emotionally important (Moray, 1969). Moray (1959) showed long ago that subjects would respond to their names in the unattended channel. This was referred to as the "Cocktail Party effect" after the common situation experienced in a crowded room when, out of the noise in the room, a person distinctly hears someone say his or her name. Apparently the extraordinarily high degree of salience and meaningfulness of a person's name is enough to break through the selective attention filter.

Other studies have shown that ambiguous sentences transmitted through the attended ear can be biased in terms of meaningfulness by a word in the unattended ear (Lackner & Garrett, 1972; McKay, 1973). For example, McKay (1973) presented the attended ear with the ambiguous sentence

"They threw stones toward the bank yesterday"

where "bank" was a lexically ambiguous word, and in the unattended ear presented either "river" or "money". Subjects were then to choose from a pair of sentences the sentence which best clarified the meaning of the ambiguous word:

"They threw stones toward the side of the river yesterday."

"They threw stones toward the savings and loan association yesterday."

The subjects' responses were biased toward choosing the sentence which corresponded to the meaning given by the word given in their unattended ear. The message in the unattended ear was being processed at some level of meaning capable of biasing the listener to a certain understanding of an ambiguous sentence in the attended ear.

The penetration of the unattended stimuli into more than just sensory feature analyzers of attentional processing was also demonstrated by Nielsen and Sarason (1981). They presented different kinds of "emotional" words in the unattended channel. They found that sexually explicit words intruded upon the subject's performance on a focused attention task. When sexually explicit words were presented in the unattended channel, performance on the shadowing task was inhibited. Performance was measured by the ability to shadow a paragraph heard over the attended channel without any mistakes. As opposed to other types of emotional words, only sexually explicit words appeared to break through the focused attention barrier and inhibit the shadowing task. Studies using such meaningful or highly salient words have provided evidence that unattended stimuli can intrude upon another task and influence performance (Nielsen & Sarason, 1981; Bargh, 1982). Such studies could suggest that radio advertisements, even if not remembered, could have some effects on the listener.

Considered together, the above studies suggest that unattended stimuli sometimes can be analyzed at more than just a sensory level. Furthermore, they can be analyzed in terms of meaningfulness, and this meaningfulness can influence the response, which goes against the idea that unattended information is not analyzed beyond mere sensory processing. Without information processing research to support much of what advertisers do, radio advertisers would nevertheless predict that unattended information can be and is processed beyond the sensory level, but they would not necessarily know in what way their information is being processed.

Summary

This review of media research and selective attention research has exposed at least one limitation in each area. For media research, the limitation involved the forced-exposure technique which did not adequately represent a real-world situation, especially in regard to radio. For selective attention, the limitation of much of the early research was that it was void of any meaningful applications due to its use of rather simple stimuli for the unattended ear and the highly artificial nature of the laboratory dichotic listening task. Although the research was no doubt intended to generate or test a theory, it was not until later that researchers outside of the mainstream of

attention research demonstrated that meaningful stimuli could be processed from the nonattended ear.

Overview of Experiments

The present experiments provided a way to address the above weaknesses and give support for the selective attention processing of meaningful unattended stimuli. First, these experiments used a more common real-world environment than much previous media research by requiring subjects to perform a specific paper-and-pencil task with the radio playing as a background stimulus. They were told that the experiment concerned the effects of radio distraction on performance and that they were to concentrate on the task at hand. Second, the radio format contained commercials that were designed to be highly relevant to certain paper-and-pencil tasks on which the subjects were working. These two elements produced a real-world situation with a meaningful stimulus intended to break into the subject's attentional processes. Although a shadowing task was not used, the principle is the same by occupying the attention of the subject with a cognitive task. The hypothesis was that the subjects would attend to the advertisement relevant or meaningful to their own particular task, rejecting the other advertisements in the radio format. The first experiment was designed to provide the majority of the support for the hypothesis, with the second

experiment serving as a check on a possible alternative explanation.

EXPERIMENT 1

Method

Subjects. The subjects were 95 students from General Psychology classes who participated in partial fulfillment of a class requirement. This sample of college students was especially appropriate for this experiment, in that this age group represents a population of frequent radio listeners.

Materials. A single radio format was pre-recorded on a cassette tape. The format consisted of current songs taken from a "Top 40" radio station and a block of four experimental commercials (described below) of about 30 seconds each interspersed approximately every 7 minutes, with the full length of the format being about 26 minutes. Only songs with lyrics (no strictly instrumental songs) and commercials (read with light background music) were included on the tape. There were no other announcer interruptions like weather or sports reports, station identification, or conversation.

The tape was played in a stereo cassette deck with two attached speakers placed in the front-center of the experimental room, and the tape was played at a constant loudness judged to be typical of normal radio listening.

Independent Variables. The commercials were recorded by a male radio announcer at the campus radio station, to enhance the professional quality of the tape. The critical commercials advertised one of three services: a course on reading comprehension, a travel bureau service, and a tutoring program for math. These commercials were written to be directly relevant to the three task conditions described below. In addition to these three commercials, there was one "filler" commercial beginning each block of commercials. The "filler" commercials advertised an appliance store, a shampoo, and an auto repair shop and were unrelated to the other commercials or tasks. It was hoped that the commercial related to the task would break through the selective attention process, due to its meaningfulness to the task being performed. (Copies of each commercial are in Appendix 1).

The radio format presented a block of four radio commercials three times during the tape, with the "filler" commercial always beginning the block. The three target commercials followed the filler commercial, each time in a different order in the commercial break (first, middle, last). Thus, each subject heard each of the target advertisements three times, once in each serial position. The purpose of the "filler" commercials was to discourage subjects from concluding that all of the commercials were necessarily related to a cognitive task, or that they were

all repeated three times. To control for possible order effects, three tapes were made with the same songs in the same order but with the block of commercials in a different order from tape to tape.

Each subject had a specific paper-and-pencil task to do during the experimental time period. These tasks were selected to resemble the types of study activities of college students. They involved either reading for comprehension, recalling by way of a visual-spatial task items in specific categories stored in memory, or performing simple and complex algebra problems.

The reading comprehension (RC) task was taken from a manual for the general review of high school equivalency exams (Lees, Goodman, & Sloyan, 1983). They consisted of nine passages taken from the fields of History, Social Science, Natural Science, and Literature, with specific questions following each passage relating to the reading comprehension of the passage (43 questions in all).

The second task was a simple map naming (MN) task requiring the subject to place the abbreviations of the names of states or countries on various maps. Maps of the United States, Europe, Africa, South America, Central America, and the Middle East were provided on separate pages with the outlines of the states or countries to be named. Another page provided a list of 155 states or countries, organized according to the map they related to, for the

subjects to fill in on the appropriate map. The maps themselves were not identified by their respective geographical titles.

The third task (Algebra Skills-AS) consisted of a list of 212 algebra problems, including addition, subtraction, multiplication, division, and combinations of processes, which the subject was to solve. All three tasks were designed to be long enough so that the subjects would not finish them before the taped radio format ended. (Copies of each task appear in Appendix 2).

Dependent Variables. A response task, called the "Distraction Questionnaire", was given asking each subject about the radio format and the radio advertisements. Besides asking questions about things such as the difficulty of the task and the amount of distraction the radio was, this questionnaire also tested the memory for both the commercials and the songs in the radio format.

Another response task, called the "Radio Listening Habits Questionnaire", sought relevant background information about listening habits. Demographic data as well as information regarding the amount of time spent listening to the radio and the type of programs listened to on the radio were included on this questionnaire. (Copies of response tasks appear in Appendix 3).

Procedure. Subjects signed up for an experiment on "The performance on a paper-and-pencil task with radio music

playing in the background" and were given one of the three paper-and-pencil tasks upon entering the room, with all subjects in any one session doing the same task. They sat at desks spaced equally apart with no more than 15 subjects in one group. Instructions for each task were at the top of the task sheets found in Appendix II. The experimenter gave a short introduction to the experiment, portraying it as a study on the effects of radio distraction on performance of a given paper-and-pencil task. No mention was made of the commercials specifically. Subjects were asked to concentrate on the task that they were given and to work on it the entire time the tape was on. The experimenter then instructed them to begin as soon as the taped radio program was turned on. At the end of the tape the experimenter collected the task materials and handed out both the "Distraction Questionnaire" and the "Radio Listening Habits Questionnaire". Upon completion of the questionnaires, the experimenter briefly explained the selective listening aspect of the experiment, thanked them for their cooperation and requested that they not mention the point of the experiment to anyone who might participate in the experiment later.

Design. The design was a 3x3 factorial with the two between-subjects factors being the Task and the tape with the different order of the block of commercials. Nine groups of subjects were tested with each group performing

one of three tasks while listening to one of three orders of the commercials in the radio format (see Table 1). The primary response measure was the rating of the degree of certainty that the subject had heard each commercial. A rating of 1 represented that the subjects were certain they had not heard the commercial and 5 that they were certain they had heard the commercial and 3 being that they were uncertain whether or not they had heard the commercial.

Insert Table 1 about here

Hypothesis. I hypothesized that subjects would selectively attend to the radio advertisement that bore some similarity to the task they were performing, recognizing that commercial at a significantly greater level than their recognition of the other two target advertisements.

Results

An overall ANOVA was done with Task and Commercial being the independent variables, a Commercial within Task design. The means of the analysis are found in Table 2. An overall main effect was found for the commercials [$F(5, 460) = 204.71$, $p < .001$], and also an interaction between Task and Commercial [$F(10, 460) = 4.34$, $p < .001$]. A Newman-Keuls test of the marginal sums of the ratings of the

memory for the commercials showed that the Reading Comprehension commercial and the Math Tutoring commercial were not rated significantly different from one another, nor were the Appliance Store and the Shampoo commercial, nor the Travel Bureau and Auto Repair commercial. All other combinations of pairs of comparisons were significantly different.

The most important comparisons to note are the Travel Bureau commercial and the Reading Comprehension and Math Tutoring commercials. The ratings of the memory for the Travel Bureau commercial was analyzed by the Newman-Keuls test and found significantly different from both the Reading Comprehension commercial (C.R.=23.84, $p < .01$) and the Math Tutoring commercial (C.R.=26.98, $p < .01$), whereas the Reading Comprehension and the Math Tutoring commercials were not significantly different from each other. The interaction main effect between the Task and Commercial has led to the following individual analyses of each commercial by the type of task.

An ANOVA was done on the recognition ratings of each critical and filler commercial, with type of task and the tape/order as the independent variables. Although it was expected that there would be no order effects, one order effect was found out of the six ANOVAs. This effect was found for the Reading Comprehension commercial [$F(2, 86)= 5.05$, $p < .008$], with the means being 4.91, 4.93, 4.40, for

Tapes 1, 2, and 3 respectively. No other main effects involving order were found.

Insert Table 2 about here

The mean ratings of the recognition of each commercial by task are shown in Table 2. Three main effects of task on the target commercial ratings were predicted. A main effect would signify that the rating of the target commercial for that particular group (e.g. Travel Bureau commercial for the MN task) was different from at least one of the ratings for the other commercials. However, only one such effect was found, for the Travel Bureau commercial [$F(2, 86) = 7.24$, $p < .001$)]. A post-hoc comparison with the Newman-Keuls test showed that the ratings of the Travel Bureau commercial were significantly different only between the Map Naming group and the Reading Comprehension group (C.R.= 1.28, $p < .01$). Although of little importance to the hypothesis, the Newman-Keuls test also showed a significant difference between the rating of the Travel Bureau commercial by the Reading Comprehension group and the Algebra Skills group (C.R.= .85, $p < .05$).

Although no significant effects for memory for the filler commercials were predicted, there was a main effect of Task on memory for the Auto Repair commercial, with an

unexpectedly high mean rating by the subjects doing the Reading Comprehension Task [$F(2, 87) = 3.11$, $p < .05$]. The Newman-Keuls test showed that the ratings of the Auto Repair commercial were significantly different between the Map Naming group and the Algebra Skills group (C.R.= .82, $p < .05$), and the Map Naming group and the Reading Comprehension group (C.R.= 1.25, $p < .01$). It should be noted that these filler commercials were heard only once and that no other main effects were found on memory for these commercials.

Discussion

Overall effects. A main effect for Commercial in the overall analysis of the Task and Commercial would have been expected as well as a main effect for the interaction between the Task and Commercial. However, the Newman-Keuls analysis did produce some unexpected findings. The difference between the commercials heard three times (target commercials) and those heard only once (filler commercials) should have been expected and was found with the exception of the Travel Bureau commercial and the Auto Repair commercial. These two commercials were from different categories (target/filler) and would predictably have been rated differently, but as mentioned above, were not. Furthermore, the Travel Bureau commercial was found significantly different from the other two target commercials and the Auto Repair commercial was found significantly different from the other two filler

commercials. These findings were not expected and were investigated in further analyses.

Order effect. Little can be understood from the present study as to the main effect for order in the memory for Reading Comprehension commercial. Two of the cells (Reading Comprehension and Algebra Skills) in the experimental groups which heard the third tape seemed to be unexpectedly low (3.87, 4.18), compared to the ratings in the other cells (4.70-5.00) for the Reading Comprehension commercial. With Tape 3, the Reading Comprehension commercial was in the second, third and fourth position respectively, in the three commercial blocks. The only feasible possibility may be a recency effect since the Reading Comprehension commercial was the last commercial heard before the questionnaires were handed out. However, since there were no other order effects among the other tasks, this explanation is not very convincing.

Task effects. The initial hypothesis predicted that the commercial corresponding to the task performed would be rated higher than when it was rated by the subjects doing another task. This was based on the premise that people selectively attend to sensory input which is more salient to the listening context. The present study supported this in only one of its Tasks/Commercial combinations, i.e., the Map Naming task and the Travel Bureau commercial. One would expect that, if a selective attention process were

occurring, the ratings of each commercial would be high when paired with the corresponding task and lower in the other two conditions. However, as can be seen in Table 2, the ratings are quite high for both the Reading Comprehension and Math Tutoring commercials across all tasks. A reasonable explanation for this is that these two commercials were highly salient for reasons other than the task being performed. The fact that the experiment was done in a college environment and that the subjects were largely freshman (70% of the subjects) might have had a stronger effect than the experimental manipulation. Reading comprehension and math skills are both important to new collegians learning how to learn in college. Thus, there appears to be a noticeable ceiling effect with these two commercials regardless of task. Data from the ratings of these two commercials do not disconfirm the stated hypothesis since the target commercials were recognized and rated quite high, as would be expected, although there were no differential effects from groups performing the other two tasks.

The significant main effect found for the third commercial does support the hypothesis, at least partially. Table 2 shows that the Travel Bureau commercial was rated highest in the Map Naming task and there was a significant difference among the three tasks in terms of commercial recognition. This finding would be expected if a selective

attention process to the Travel Bureau commercial was occurring in the context of performing the Map Naming task. It is interesting to note that, unlike the other commercials, this commercial is characteristically not targeted toward a college population, and the Map Naming task is less directly related to the commercial, unlike the obviously related Reading Comprehension and Math Tutoring commercials to their respective tasks. Considering that the Travel Bureau commercial is not as pertinent to college students as were the other commercials and that it is not as closely related to the task context as the other commercials, it would seem less likely that it would be rated higher unless a "selective filter" mechanism were operating, e.g., as caused by performing the Map Naming task.

Although an ANOVA did show a significant difference in the ratings for the Travel Bureau commercial, a Newman-Keuls test showed that the Map Naming group did not rate it significantly higher than both of the other groups. This finding lessens the impact of the above discussion in that the conclusions drawn are not as strongly supported by the post hoc test. Nevertheless, the ratings were in the expected direction with the Map Naming group rating the Travel Bureau commercial higher than the other two groups. Further discussion of the possible causes of the lack of a significant difference between the Map Naming group and the

Algebra Skills group will follow in the discussion of additional analyses.

The other main effect, i.e. Task on memory for the Auto Repair commercial, is similar to the first main effect discussed above in that it was not expected either. This commercial (Auto Repair) was only heard once during the radio format, although it was the first commercial in the last block of commercials giving some weight to a primacy effect explanation. Also, the salience of this service to college students could have set it apart from the other filler commercials. However, either explanation would have expected all the groups to have rated it higher than the other filler commercials. A Newman-Keuls test comparing the ratings of Auto Repair commercial between the three groups showed that the Reading Comprehension group and Algebra Skills group ratings were significantly higher than the Map Naming group ratings, although the Map Naming group ratings were not noticeably different from the other filler commercial ratings. The difference between the ratings of the Auto Repair commercial between tasks might consequently be due to some other factor not yet accounted for, a factor which might be indicated by the rating of the difficulty of the task, an issue which will be discussed in the additional analyses following Experiment 2.

EXPERIMENT 2

Method

One possibility not considered yet is that the target commercials might be cuing the subjects to remember all the commercials. The subjects may have had the idea that the commercials must be an important part of the experiment, since one of the commercials apparently related to the task they were doing. Therefore, Experiment 2 was done with the target commercials removed from each block of commercials for the respective task situation. For example, the Reading Comprehension task group had the Reading Comprehension commercials removed from the block of four commercials, thus leaving only three commercials per block. Since subjects never heard the commercial relevant to the task they were engaged in, order effects were assumed not to be present; consequently, there were only three groups, a total of 31 subjects. If the target commercials were cuing the attention to remember all the commercials, then it would be expected that the ratings would drop relative to Table 2 for the other commercials when the target commercials were removed.

Results

Since no order effects were anticipated in this experiment, one-way ANOVAs were done on the ratings of the recognition of the commercials with the independent variable of Task. Table 3 shows the mean ratings of this experiment.

Insert Table 3 about here

Due to the omission of the target commercials, the Reading Comprehension and Math Tutoring commercials were rated significantly different across tasks [$F(2, 28) = 11.29$, 8.66]. However, recognition of the Travel Bureau commercial this time did not differ significantly across the tasks. The respective ratings of the target commercials did not differ greatly from their corresponding ratings in Experiment 1, except where the commercial was omitted (means in parenthesis in Table 3).

There were no significant differences among the filler commercials across tasks, although it is interesting to note that the Auto Repair commercial is rated lower in Table 3 than in Table 2 for the Reading Comprehension and Algebra Skills tasks, where its differences across tasks were significant. Also, the Shampoo commercial has a rather high rating for being heard only once in the radio format of the Reading Comprehension task.

Discussion

The ceiling effects for memory for the Reading Comprehension and Math Tutoring commercials seem to hold true in this second experiment, in that their ratings remained high and did not drop drastically, as would be

expected if they had only been cued by the target commercials in Experiment 1. The significant results are the result of omitting the target commercial (e.g. the Reading Comprehension commercial omitted from the tape of those doing the Reading Comprehension task), which produced low recognition ratings from the subjects who never heard that commercial. Since they never heard the commercial, the subjects' ratings were expected to be three or below. This is true in all cases concerning the target commercial and its respective task.

The significant finding in Experiment 1 with the Travel Bureau commercial was not significant in Experiment 2. It is important to realize that this commercial was not heard by the group which did the Map Naming task but was heard by the other two groups. Therefore, the fact that no significant difference was found between those who did and those who did not hear the commercial signifies that the other commercials were not cuing the subjects to remember all the commercials. Those who did hear the Travel Bureau commercial rated it about the same as in the first experiment, and those who did not hear it rated the other commercials high, similar to those in the first experiment. The Travel Bureau commercial recognition rating did not appear to have a ceiling effect in either experiment, which probably then best exemplifies what was expected for each

commercial had there been no ceiling effects in memory for the other commercials.

As noted above, there were no main effects for the filler commercials in Experiment 2, in contrast to Experiment 1. The arguments given for the high ratings with the Auto Repair commercial in Experiment 1 were not supported in Experiment 2, since that commercial was still the last filler commercial to be heard and, if it was more salient to such a college population, it was not recognized as such in Experiment 2. Strangely enough, the Shampoo commercial was rated rather high and there seems to be no logical explanation for it, outside of the fact that all of the cells in Experiment 2 had small n's. Another problem arises, since there were only three commercials instead of four to remember, but, as the data show, there were no uniform increases in the ratings across all the tasks or commercials which could be expected if it were any easier to remember three, as opposed to four, commercials.

ADDITIONAL ANALYSES

Two further pieces of data may help clarify some of the findings in these two experiments. These data were taken from two questions on the Distraction Questionnaire: "How difficult do you think the task was?" and "How much do you feel the radio prevented you from performing your task to the best of your ability?" The analyses combined the

responses from both experiments (126 subjects) and are shown below in Table 4.

Insert Table 4 about here

One-way ANOVAs with Task as the factor were done with both of the question responses, and the differences among the ratings were significant [F (2, 125)= 78.66 (Difficulty) and 29.87 (Hindrance), both $p_s < .001$]. Newman-Keuls tests showed that the ratings of task difficulty between the Algebra Skills and the Map Naming groups were significantly different (C.R.= .37, $p < .01$), as were the ratings between the Map Naming and the Reading Comprehension groups (C.R.= .28, $p < .05$), and the Algebra Skills and the Reading Comprehension groups (C.R.= .42, $p < .01$). Also, Newman-Keuls tests showed that the ratings of radio hindrance between the Algebra Skills and the Map Naming groups were significantly different (C.R.= .30, $p < .05$), as were the ratings between the Map Naming and the Reading Comprehension groups (C.R.= .50, $p < .01$), and the Algebra Skills and the Reading Comprehension groups (C.R.= .40, $p < .01$).

Subjects rated the Map Naming task the most difficult and the Algebra Skills task the easiest. The Map Naming task was also considered least affected by the radio playing

in the background. The tasks were clearly of differing degrees of difficulty, and this could have affected how the commercials were attended to and recognized. If difficulty could be seen to reflect the amount of mental activity required, then the Map Naming task could be seen as taking the most attention, which seems inconsistent with the findings in Tables 2 and 3 which showed those in the Map Naming task recognized all the commercials heard three times to a very high degree. Although highly difficult, the Map Naming task was also considered the least affected by the radio. This data tend to suggest that, possibly because the difficulty was so great, attention was not given as much to it as to other stimuli, and, therefore, attention was given to the radio. It should be noted that no one in the Map Naming group completed all of the maps.

The Reading Comprehension task was rated almost as high as the Map Naming task in terms of difficulty and the most hindered by the radio. In looking at the Tables 2 and 3 the recognition of the Travel Bureau commercial was rated the lowest in the Reading Comprehension task. This would make sense in light of the observation that the Travel Bureau commercial was different from the other two commercials in that it was not as directly relevant to a college student. Here, the difficulty of the Reading Comprehension task could be understood as engaging more of the subject's attention and the radio providing more of a hindrance.

The Algebra Skills task was the easiest to perform and the radio distracted only "a little". This also is reflected in Tables 2 and 3 for the ratings of recognition of the Travel Bureau commercial, which was rated by Algebra Skills subjects higher than it was by subjects doing the Reading Comprehension task. As noted in the discussion of Experiment 1, the Newman-Keuls test did not show a significant difference in ratings of the Travel Bureau commercial between the Algebra Skills and the Map Naming groups. The difference in perceived difficulty of the tasks could provide a partial explanation for this finding. Although it was considered the easiest task and one might thus expect that recognition would be high for all the commercials (more like the Map Naming ratings), subjects also thought that the radio did serve as a minor hindrance. Evidence that the radio did affect commercial recognition in the Algebra Skills task could be seen with the rating of the Travel Bureau commercial, which was rated between the rating of the Reading Comprehension task (seen as most hindered by radio) and the Map Naming task (seen as least hindered).

In response to the ratings of memory for the Auto Repair commercial from Experiment 1, the commercial was remembered most poorly by the Map Naming group and significantly higher by the other two groups. The difficulty of the Map Naming task combined with the salience of the commercial could have contributed to the effect of it

being rated lower by the Map Naming group. However, Experiment 2 does not affirm this explanation, in that the ratings for the Auto Repair commercial were not noticeably higher than the other commercial ratings.

Two items from the "Radio Listening Habits" questionnaire were looked at, responses from one indicating the amount of time spent listening to the radio per week and the other indicating the frequency of listening to the radio while doing school work. ANOVAs were done with both of the responses and the recognition ratings for the time listening to the radio were grouped into the categories of 0-6 hours/week, 7-12 hours/week, 13-18 hours/week, and more than 18 hours/week. It might have been the case that, the more someone listens to the radio, the better they might be at dividing attention or the more someone listens to the radio while doing school work, the better they might be at listening to the radio at the same time. There were no significant differences in performance based on the amount of time listening to the radio per week. In other words, heavy listeners (18+ hours/week) did not do any better or worse than light listeners (0-6 hours/week), or any of the other categories, in recognizing the commercials. Likewise, there were no significant differences in recognition of commercials between those who listened to the radio frequently (Always or Quite often) and those who listened to

it moderately (Often or Occasionally) or infrequently (Seldom or Never) while doing school work.

Three other items not directly relevent to the present hypothesis yet of potential research interest are the frequencies of the ratings of the memory for the commercials that were not heard, the memory for the songs heard and memory for songs not heard. The recognition measure for the commercials on the Distraction Questionnaire included 23 commercial topics that were never presented on the radio tape. The mean rating for memory of all the commercials that were not heard (1.68) is lower than the mean rating of the filler commercials only heard once (2.45) and the target commercials heard three times (4.35). This does seem to indicate that the subjects were not just guessing but were truly responding to what they heard. This is further confirmed when the frequencies for ratings of the memory for the songs were reviewed. The mean rating for memory of all the songs not heard (1.69) was almost exactly the same as the mean rating for the commercials not heard, demonstrating some consistency among the ratings for the non-heard items on the recognition task.

Another interesting finding was of the mean rating of the memory of the songs that were actually heard on the radio tape (3.98). The subjects, for having heard the songs only once, had fairly good recognition of what they had heard, given that they were not focussing on the radio

playing in the background. This certainly is supportive of a selective attention perspective which proposes that nonattended stimuli of a more complex nature can be remembered and identified.

GENERAL DISCUSSION

The hypothesis that the type of task would influence the ability to selectively attend to a radio commercial was supported by one finding in the above experiments; this finding was the effect of performing the Map Naming task on memory for the Travel Bureau commercial. There appears to be some degree of selective attention between the Map Naming task and the Travel Bureau commercial that was not evident with the other tasks and commercials. However, in order to be able to understand the principle of selective attention with regard to the relationship between a task and a corresponding commercial, other factors such as the difficulty of the task and the amount of perceived hindrance of the radio as a background stimulus also must be taken into account. A variety of combinations of degree of difficulty of tasks and amount of distraction could help to separate out the effect of task on the ability to selectively attend to radio commercials.

As noted in the introduction, the radio is played as background stimulus in a variety of environments and during a variety of tasks. There is still reason to believe that selective attention can be enhanced to recognize radio

commercials in a given context, but consideration must also be given to the amount of attention given to those other tasks, be it driving a car, preparing dinner or doing school work. Furthermore, there is the understanding that attention fluctuates during any given task, which can also complicate the issue.

The "levels-of-processing" model of information processing might provide some insight into planning further research (Craik & Lockhart, 1972). Craik and Lockhart (1972) proposed that the ability to remember is related to the amount of mental elaboration at which information is processed. The finding that the three tasks in this experiment were rated differently in terms of perceived difficulty might reflect different levels of processing. There might be an inverse relationship between the level of processing of a certain task and the ability to attend to other incoming stimuli.

The degree of involvement, an advertising research concept developed by Krugman (1965), might also provide a foundation for further research. Involvement represents the amount of mental activity, including emotional aspects, given to a piece of information in an advertising context. Cognitive psychologists have assumed that advertising was a high-involvement type of processing until most recently (Batra & Ray, 1983). The role of affect comes in to play in the area of involvement and might be equally as important in

radio advertising as it is in television. Further research might possibly take this into account in analyzing the influence of commercials on subjects.

The present study brings to the awareness of both advertisers and researchers the potential for application of cognitive theories and concepts to marketing. Specifically, radio advertisers should be conscious of the nature of the radio medium and how the target population or listening audience might selectively attend to radio commercials. The meaningfulness of the content of a message, either words or phrases, and its relation to the context of the listener might be as important as the product or service presented, and that might be the key to attracting the listener's attention.

For future research, the problem of the ceiling effects in this experiment might be solved by creating commercial/task combinations of a more subtle nature, as in the Travel Bureau commercial and the Map Naming task. Similarly, creating commercials which may not be as salient to the target population as opposed to the ones in this experiment which were highly salient to a college population might reduce the chance of a ceiling effect. Reducing the number of times a target commercial is heard and increasing the number of commercials in a radio format might also help with the ceiling effect problem. In order for the understanding of selective attention and radio commercials

to be enhanced, the problem of the ceilng effect must be effectively controlled.

One last comment relating to the research techniques applied here is appropriate. The experiment purposely avoided dichotic listening and shadowing tasks in an attempt to make the setting more naturalistic. I believe that the approach used in this study demonstrates that the process of selective attention can be rigorously studied apart from traditional laboratory techniques, and can be better suited for providing possible applications to "real-world" situations, as in listening to radio advertisements. Therefore, more fruitful research might be possible using similar techniques which have more ecological validity than the dichotic listening and shadowing tasks.

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TABLE 1

Design of Experiment 1

	Tape/Order[a]			
Task	1	2	3	
Reading comprehension	n=9	n=10	n=9	
Map naming	n=11	n=10	n=10	
Algebra skills	n=11	n=10	n=15	N=95

[a]Commercial order

1= AP, (TB, MT, RC); SH, (RC, TB, MT); AU, (MT, RC, TB)

2= AP, (MT, RC, TB); SH, (TB, MT, RC); AU, (RC, TB, MT)

3= AP, (RC, TB, MT); SH, (MT, RC, TB); AU, (TB, MT, RC)

MT= Math Tutoring AP= Appliance Store

RC= Reading Comprehension AU= Auto Repair

TB= Travel Bureau SH= Shampoo

TABLE 2

Experiment 1: Mean Recognition Ratings[a] of Commercials, by Task

		COMMERCIALS					
TASK	n	Reading Compreh	Travel Bureau**	Math Tutoring	Applian Store	Shampoo	Auto Repair*
Reading Compreh	28	4.67	2.49	4.92	2.06	2.26	3.99
Map Naming	31	4.87	4.19	4.70	2.02	1.67	2.19
Algebra Skills	36	4.72	3.49	4.94	1.55	2.22	3.32

**=p<.001 *=p<.05

[a]1=Certain did not hear, 3=Uncertain, 5=Certain did hear

TABLE 3

Experiment 2: Mean Recognition Ratings [a] of Commercials, by Task, Target Commercial Removed

		COMMERCIALS[b]					
TASK	n	Reading Compreh*	Travel Bureau	Math Tutoring*	Applian Store	Shampoo	Auto Repair
Reading Compreh	10	(1.80)	2.90	4.60	1.40	4.00	2.60
Map Naming	11	4.27	(1.81)	5.00	1.81	3.72	2.27
Algebra Skills	10	4.50	3.50	(2.90)	2.00	3.10	2.00

*=p<.001

[a] 1=Certain did not hear, 3=Uncertain, 5=Certain did hear

[b]()= commercial omitted from radio format

TABLE 4

Task Difficulty and Hindrance Ratings

	TASK			
	Reading Compreh	Map Naming	Algebra Skills	
Difficulty*a	2.92	3.21	1.38	
Hindrance*b	1.79	3.09	2.78	
n	38	42	46	126

*p<.001

a1=Easy, 2=More easy than difficult, 3=More difficult than easy, 4=Difficult

b1=Very much, 2=Somewhat, 3=A little, 4=Not at all

APPENDIX 1

TARGET AND FILLER COMMERCIALS

COMMERCIAL 1: READING COMPREHENSION

Literature, history, science... are you having trouble understanding what you read? Do you read sentences or paragraphs and are then unable to recall what you have read right afterwards? The Reading Comprehension Academy can help. We offer classes to help you get the most out of your reading time. This is not a speed reading program but an intense reading comprehension training course designed and proven to help increase the understanding of what you read the first time through. Let the Reading Comprehension Academy put you on the way to academic success.

COMMERCIAL 2: TRAVEL BUREAU

Have you ever thought about going to Europe, South America, Africa, the Middle East, Central America, or Asia? If so, let Crossroads Travel make those travel arrangements for you. We can plan your next trip to anywhere in the world. We will give you the best rates and the most exciting itineraries. We can also arrange travel plans by train, bus, or plane to anywhere in the

United States. Crossroads Travel--your first step for your next journey, near or far!

COMMERCIAL 3: MATH TUTORING

Do you seem to have a mental block when it comes to doing simple algebra? Do calculations of any kind frustrate and repulse you? Let Math Concepts Tutoring reduce that stress. We offer individual, personal tutoring by highly qualified professionals to give you the confidence and the tools you need for quick mathematical thinking. We will train you to do equations, previously thought impossible without paper and pencil, in your head quickly and accurately. Don't let numbers do a number on you. Come to us, Math Concepts Tutoring, we can help!

COMMERCIAL 4: FILLER 1, APPLIANCE STORE

Come to the small appliance sale at the Downtown Appliance Center. We have small refrigerators, toaster ovens, food processors and much more at 15 to 20% off. We will beat any price in town on comparable units. We also service what we sell and can arrange easy credit terms. Don't be left out of this incredible sale. Hurry on down to the Downtown Appliance Center, in the center of Fourth Avenue, Downtown--sale ends this weekend.

COMMERCIAL 5: FILLER 2, SHAMPOO

Thin, dry, dull, damaged-- do any or all of these words characterize your hair? Renew Shampoo can change all that by adding the elements your hair needs for thickness, body, brilliance and bounce. Renew Shampoo is unique among shampoos because of its special penetrating ingredients which lock in those beautifying elements other shampoos often wash out. Regular shampoos remove while Renew Shampoo renews! Sold only in Styling Salons.

COMMERCIAL 6: FILLER 3, AUTO REPAIR SHOP

Does your car look like an accident looking for a place to happen? Are you familiar with the phrase, "The body ain't much, but at least it runs well."? If so, Mack's Car Body and Paint Shop can help get that beast of yours looking like a beauty in no time. We have the best repairmen in town, the most resonable rates and the most satisfied customers. Come by for a friendly, free estimate. That's Mack's Car Body and Paint Shop, on the west side at the corner of 19th and Lincoln Streets.

APPENDIX 2

INSTRUCTIONS AND MATERIALS

OPENING INSTRUCTIONS

My name is John Bechtold. This experiment is done in partial requirement for my Masters degree. I am doing a study on the effect of background stimuli on performance of a variety of cognitive tasks. In other words, I want to see if a radio playing in the background will influence performance on a task which requires thinking.

I will hand out a set of _____ [reading materials, number problems, maps] and ask that you follow the directions at the top of the page. In each case you are to work in order from _____ [one to forty-three, one to 212, map one to map six] being sure to complete each _____ [passage and questions, problem, map] as best as you can before moving on to the next _____ [passage, problem, map]. Once you receive the task I will turn on a taped radio program and ask you to begin and work until the tape is turned off -- in about 25 minutes. Please work as carefully and accurately as possible -- this is not testing for speed but for accuracy. It is intended that you not finish the whole task. Guess if you have to so that

you do not leave any blank up to the point you have to stop.

When the tape is turned off, I will collect the materials and give you a couple of questionnaires relating to the task. Please complete these according to the instructions provided. Do not look beyond each page of the questionnaire before you complete the page you are on. I would ask that you work quietly and diligently. Are there any questions? Please sign the consent form and pass it to the front. This experiment is good for one hour credit. You may begin as soon as the radio program is turned on.

DEBRIEFING

Besides seeing how well you did on the task, this experiment was also designed to discover if you paid any attention to the radio, especially the commercials. The questionnaires probed into this issue by asking a variety of questions relating to your ability to either recall or recognize things played on the tape. They also describe factors which might have influenced your ability. Since knowledge of the questionnaires might influence a person's performance of this experiment, I would ask that you do not discuss this aspect of the experiment with any of your friends or classmates who might also be participating. Thank you very much for your cooperation.

READING COMPREHENSION TASK

Directions: Each passage in this group is followed by questions based on its content. After reading a passage, choose the best answer to each question. Answer all questions following a passage on the basis of what is *stated* or *implied* in that passage.

DO NOT WRITE ON THESE SHEETS--USE ONLY ANSWER SHEETS

Passage 1

After more than two centuries of experience, control of the Missouri-Mississippi has been reduced to four methods. First we have levees, the oldest of all. Second comes the enlargement of the discharge capacity by straightening, widening, and deepening natural channels. Third in importance are the spillways, which guide excess water into auxiliary channels or let it flood fairly small areas. Last we have reservoirs to store up excess water, which may be released when natural channels are again able to carry it. Of these four methods the construction of levees is still the surest because flood elevations are well known. Reservoirs are good but limited in usefulness because their benefits decrease with distance from the communities that are to be protected.

Despite the height that the water once reached at St. Louis, and despite the wandering, homeless people and the damage to property and crops, the engineers have reason to survey their efforts at flood control with satisfaction. But, as has been frequently suggested, it is about time that a Missouri River Authority was created to deal with the problems of flood control, navigation, and power development.

1. Which of the following statements best sums up the author's opinion on the solution of the problem?
   A. Each state watered by the Missouri-Mississippi must handle its own flood problems.
   B. The federal government has been lacking in its interest in this problem.
   C. Losses in property and lives must simply continue to be regarded as acts of nature.
   D. An overall controlling agency must be organized to deal with the entire problem.
   E. There is very little that has been done and even less that can be done in the future.

2. One of the techniques for controlling the river complex under discussion actually involves
   A. permitting minor flooding
   B. cutting off the entire flow of the rivers
   C. diverting the flow to other river channels
   D. leveling built-up areas along the banks of the rivers
   E. letting nature take its course

DO NOT WRITE ON THESE SHEETS

3. The attitude of the engineers with regard to the effectiveness of their work would probably not be shared by
   A. the federal government
   B. fishermen along the riverways
   C. residents of cities such as St. Louis
   D. riverboat captains
   E. the governors of the states along the rivers

4. Which of the following statements indicates the author's overall conclusion?
   A. The problem of flood control is an isolated phenomenon and must be treated as such.
   B. The total problem involving the Missouri-Mississippi comprises flood control, power development, and navigation.
   C. The TVA program has proved itself a worthwhile model to be followed in other areas.
   D. Individual groups affected by floods refuse to take a broad view of the problems involved.
   E. Since this problem has been with us for almost two hundred years, there is little we can do to solve it.

Passage 2

There are few books that go with midnight, solitude, and a candle. It is much easier to say what does not please us at that time than what is exactly right. The book must be, at least, something benedictory by a sinning fellow human being. Cleverness would be repellent at such an hour. Cleverness, anyhow, is the level of mediocrity today; we are all too infernally clever. The first witty and perverse paradox blows out the candle. Only the sick mind craves cleverness, as a morbid body turns to drink. The late candle throws its beam a great distance, and its rays make transparent much that seemed massy and important. The mind at rest beside that light, when the house is asleep and the consequential affairs of the urgent world have diminished to their right proportions because we see them distantly from another and a more tranquil place in the heavens, where duty, honor, witty arguments, controversial logic on great questions, appear such as will leave hardly a trace of fossil in the indurated mud which will cover them—the mind then smiles at cleverness. For though at that hour the body may be dog-tired, the mind is white and lucid, like that of a man from whom a fever has abated. It is bare of illusions. It has a sharp focus, small and starlike, as a clear and lonely flame left burning by the altar of a shrine from which all have gone but one. A book which approaches that light in the privacy of that place must come, as it were, with open and honest pages.

5. According to the author,
   A. it is relatively easy to prescribe the right reading for the midnight hour
   B. late-night reading can be of any sort or variety, since the mind craves simple enjoyment
   C. it is easier to say what is not right for midnight reading than to state what is correct
   D. most people prefer to watch television rather than to read
   E. mediocre people read mediocre books at any hour

DO NOT WRITE ON THESE SHEETS

6. The author's statement that "we are all too infernally clever" is to be accepted
   A. as his view of civilization in general
   B. as a sign that he is basically a misanthrope
   C. on a somewhat limited basis
   D. as a sign that he is a political and social conservative
   E. as indicating that he is out of step with his times

7. The consequential matters of the world are best seen
   A. when they are really forgotten
   B. when one's mind is involved in something less demanding
   C. late at night
   D. when they are viewed as though from a distant and more tranquil place
   E. among one's peers in congress assembled

8. Which of the following statements best approaches the author's attitude toward cleverness?
   A. Cleverness is a human weapon against overwhelming odds.
   B. There is something bold, honest, and candid about being clever.
   C. Cleverness has something deceptive and deceitful about it.
   D. To be clever is to exhibit a high order of sophistication.
   E. Most people these days prefer direct, honest judgment.

9. Although the body may be extremely weary late at night, the mind is
   A. pale and wan
   B. lucid and sharp
   C. demanding of simple entertainment
   D. limp and blank
   E. hostile to new ideas

Passage 3

No step in life is more important than the choice of a vocation. The wise selection of the business, profession, trade, or occupation to which one's life is to be devoted and the development of full efficiency in the chosen field are matters of the deepest moment to young men and to the public. These vital problems should be solved in a careful, scientific way, with due regard to each person's aptitudes, abilities, ambitions, resources, and limitations and the relations of these elements to the conditions of success in different industries. If a boy takes up a line of work to which he is adapted, he will achieve far greater success than if he drifts into an industry for which he is not fitted. An occupation out of harmony with the worker's aptitudes and capacities means inefficiency, unenthusiastic and perhaps distasteful labor, and low pay, while an occupation in harmony with the nature of the man means enthusiasm, love of work, and high economic values—superior product, efficient service, and good pay. If a young man chooses his vocation so that his best abilities and enthusiasms will be united with his daily work, he has laid the foundations of success and happiness. But if his best abilities and enthusiasms are separated from his daily work or do not find in it fair scope and opportunity for exercise and development; if his occupation is merely a means of making a living, and the work he loves

DO NOT WRITE ON THESE SHEETS

to do is sidetracked into the evening hours or pushed out of his life altogether, he will be only a fraction of the man he ought to be. Efficiency and success are largely dependent on adaptation.

10. The general tone of this selection might well be attacked by a group
    A. interested in advice for young men in college
    B. interested in equal rights for women
    C. demanding that jobs and interests coincide
    D. seeking an understanding by business of the problems of youth
    E. condemning the deterioration of the use of proper English

11. The author expresses the thought that the correct choice of job or career is important to
    A. the individual involved and his or her parents
    B. only the individual involved
    C. society in general
    D. the individual and society at large
    E. the employer and the job-seeker

12. Two elements in a person's life that appear to be of great moment to the author are
    A. happiness and social adjustment
    B. happiness and good pay
    C. efficiency and success
    D. social adjustment and efficiency
    E. rapid advancement and success

13. A thought that is *contrary* to the feeling of the author is that
    A. one cannot simply relegate one's real interest in life to "spare time"
    B. a happy worker is an efficient worker
    C. if one really wants to, one can work at one's really important interests after completing the day's work
    D. tying one's interests and enthusiasms to one's job can lead to a happy work experience
    E. choosing one's career is something that calls for great care and thoughtfulness

Passage 4

The Naval Observatory this week asked the Cerro Tololo Interamerican Observatory at La Serena, Chile, to help in confirming their find. The Cerro Tololo astronomers promptly turned their powerful 158-inch telescope on Pluto and confirmed yesterday that the Naval Observatory had indeed found a Pluto satellite.

The Pluto moon has been officially designated 1978-P-1, but its discoverer, Mr. Christy, has proposed the permanent name of Charon. Besides its similarity to the name of Mr. Christy's wife Charlene, Charon was the name of the boatman in Greek mythology who ferried the souls of the dead across the river Styx into the underworld. Pluto was the god of the underworld.

The solar system's natural satellites now number thirty-three known moons and three suspected

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ones. They include one for Earth, two for Mars (which were both discovered by the Naval Observatory 101 years ago), thirteen certain and one possible for Saturn, five for Uranus, two for Neptune and one for Pluto. Neither Venus nor Mercury is known to have a satellite.

In calculating the orbit, ephemeris, and other properties of Charon, Robert S. Harrington, a Naval Observatory astronomer, made some startling discoveries, he said yesterday.

For one, Charon's orbit is apparently only 12,000 miles above the surface of Pluto—too close for the Naval Observatory telescope to see the planet and its satellite as separate objects.

Dr. Thomas van Flandern of the observatory said he hoped that the Kitt Peak National Observatory and Hale Observatory's 200-inch telescope on Mount Palomar, California, would quickly take up the search for a visible separation between Pluto and Charon.

Dr. Harrington said that he had calculated the period of rotation of Charon around Pluto as 6 days, 9 hours, 17 minutes, a period corresponding exactly to the rotation of the planet itself, as determined from fluctuations in the light it reflects from the sun.

This means, he said, that Charon is apparently in synchronous orbit, so that an observer on Pluto would always see its moon in the same place in the sky. An observer on the far side of Pluto would never see it at all.

Unlike Earth, whose poles are relatively up and down with respect to its orbit around the sun, Pluto rotates on its side. Its satellite, Charon, therefore seems to be in a north-south orbit relative to Earth.

Pluto is regarded as one of the planets most hostile to possible life forms. It is so distant from the sun that the latter would appear to a Plutonian as a large star, and the planet's temperature must be close to absolute zero. Many astronomers believe that Pluto did not originate as a planet but as a chip off the vastly larger planet Neptune.

14. Which of the following statements bears out an allusion to international cooperation among astronomers?
    A. The Kitt Peak National Observatory entered the search for a visible separation between Pluto and Charon.
    B. The name for the new moon was taken from Greek mythology.
    C. The Cerro Tololo astronomers confirmed the finding of the new moon.
    D. Mrs. Christy is foreign-born.
    E. The Hale Observatory refused to cooperate in this venture.

15. The logical connection between the name Pluto and the name Charon is that
    A. Pluto was the god of the underworld
    B. the Greeks had a well-developed science of astronomy long before the modern era
    C. Charon was the ferryman of the Styx, and Pluto was the god of the underworld
    D. both names reflect a superstitious attitude on the part of modern astronomers
    E. the discoverer's wife has a name similar to Charon

16. The name of the discoverer of the new moon is
    A. Harrington
    B. unknown

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C. Cerro Tololo
D. Mr. Christy
E. Dr. Thomas van Flandern

17. Which of the following statements is true, according to the selection?
A. The equipment of the United States Naval Observatory is too antiquated for modern observation.
B. An observer on the far side of Pluto would have a better view of the new moon.
C. There is a strong possibility of life on Pluto.
D. Charon's orbit is too close to the surface of Pluto to permit separate identification by the Naval Observatory.
E. Information from other nations about the new moon was too late in arriving.

18. The following fact has been ascertained by the astronomers:
A. there are 36 established moons in our solar system
B. there are several moons whose existence is only suspected
C. there are moons known to be or suspected to be around all the planets of our solar system
D. there is a vast difference between the satellite of a planet and its moon
E. Pluto originated as a planet in and of itself

19. In comparison with that of the Earth, Pluto's rotation is
A. on a north-south orbit
B. vertical
C. horizontal with respect to its orbit around the sun
D. impossible to ascertain
E. under close scrutiny since it appears to have changed direction

20. According to the article, some planets originated
A. as masses of cloud that solidified
B. as black holes in the universe
C. as a result of cataclysmic collisions in space
D. as chips off other planets
E. as great masses of radioactive vapors

Passage 5

The United States and other Western industrial countries may face a period of "jobless growth" in the 1980's, even if the President and other nations' leaders succeed in their declared aim of expanding business investment and ending the world recession.

This is the warning that an increasing number of economists, officials, and business people are giving Western governments as they prepare for the Bonn economic summit meeting, to be held this month. It reflects fears that any upturn in business spending, stimulated by the

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summit meeting, will merely accelerate the present trend toward replacing human workers with sophisticated new machinery instead of creating additional jobs.

"The evidence that we have is suggesting increasingly that the employment-displacing effects of automation, anticipated for the 1950's, are now beginning to arrive on a serious scale in the 1970's," concludes an unpublished report by the Organization for Economic Cooperation and Development, which monitors the economic progress of Western nations.

21. An ironic economic prediction contained in this article is that
- **A.** unpublished statements can have great effect
- **B.** an upturn in business spending may lead to great unemployment
- **C.** economic experts frequently know little about their subject
- **D.** a world recession seems inevitable
- **E.** economic recovery is a worldwide problem

22. It is apparent that statements alluded to in this selection stem from thoughts expressed prior to
- **A.** a meeting of the Common Market nations
- **B.** a conference of the United Nations
- **C.** an international economic summit meeting
- **D.** a disarmament conference
- **E.** no particular meeting

23. It would seem that the disappointing effects of automation indicated here
- **A.** were impossible to predict
- **B.** took the economic community by surprise
- **C.** are largely to be discounted
- **D.** cannot be avoided
- **E.** had been anticipated more than twenty years ago

Passage 6

It is the aim of the investigator to gain a view of the entire history of a people or a country, or of the world—in short, what we call *universal history*. In this case the working up of the historical material is the main point. The workman approaches his task with *his own* spirit; a spirit distinct from that of the element he is to manipulate. Here a very important consideration will be the principles to which the author refers, the bearing and motives of the actions and events which he describes, and those which determine the form of his narrative. Among us Germans this reflective treatment and the display of ingenuity which it occasions assume a manifold variety of phases. Every writer of history proposes to himself an original method. The English and French confess to general principles of historical composition. Their standpoint is more that of cosmopolitan or of national culture. Among us each labors to invent a purely individual point of view. Instead of writing history, we are always beating our brains to discover how history ought to be written. This first kind of reflective history is most nearly akin to the preceding, when it has no further aim than to present the annals of a country complete. Such compilations (among which may be reckoned the works of Livy and Diodorus Siculus

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and Johannes von Müller's *History of Switzerland*) are, if well performed, highly meritorious. Among the best of the kind may be reckoned such annalists as approach those of the first class, who give so vivid a transcript of events that the reader may well fancy himself listening to contemporaries and eyewitnesses. But it often happens that the individuality of tone which must characterize a writer belonging to a different culture, is not modified in accordance with the periods such a record must traverse. The spirit of the writer is quite other than that of the times of which he treats. Thus Livy puts into the mouths of the old Roman kings, consuls, and generals such orations as would be delivered by an accomplished advocate of the Livian era, and which strikingly contrast with the genuine traditions of Roman antiquity (for example, the fable of Menenius Agrippa). In the same way he gives us descriptions of battles, as if he had been an actual spectator, but whose features would serve well enough for battles in any period, and whose distinctness contrasts on the other hand with the want of connection and the inconsistency that prevail elsewhere, even in his treatment of chief points of interest. The difference between such a compiler and an original historian may be best seen by comparing Polybius himself with the style in which Livy uses, expands, and abridges his annals in those periods of which Polybius's account has been preserved. Johannes von Müller has given a stiff, formal, pedantic aspect to his history, in the endeavor to remain faithful in his portraiture to the times he describes. We much prefer the narratives we find in old Tschudy. All is more naive and natural than it appears in the garb of a fictitious and affected archaism.

A history which aspires to traverse long periods of time, or to be universal, must indeed forgo the attempt to give individual representations of the past as it actually existed. It must foreshorten its pictures by abstractions; and this includes not merely the omission of events and deeds, but whatever is involved in the fact that thought is, after all, the most trenchant epitomist. A battle, a great victory, or a siege no longer maintains its original proportions but is put off with a bare mention. When Livy, for example, tells us of the wars with the Volsci, we sometimes have the brief announcement: "This year war was carried on with the Volsci."

24. The author's purpose in writing these paragraphs is to
- **A.** compare German historians with French and English historians
- **B.** establish the superiority of modern historians over ancient writers
- **C.** give an account of the works of famous historians
- **D.** discuss various approaches to the writing of history
- **E.** argue in favor of reflective writing of history

25. The author implies that one weakness in the German approach to the writing of history is that
- **A.** instead of writing history, Germans are trying to discover how history should be written
- **B.** German historians are constantly rivaling the historians of other nations
- **C.** there is always an emphasis on the Teutonic point of view
- **D.** there is an unwillingness on the part of the Germans to investigate new methods
- **E.** there is really no particular interest in history on the part of the German people

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26. One may infer that the author's view of contemporary historical novels would be
    A. an approving one
    B. an amused contempt
    C. that such writing is really false history
    D. an envious one
    E. a maliciously critical one

27. It is to be inferred from this passage that
    A. Livy antedated Polybius
    B. Livy and Polybius were contemporaries
    C. Livy is a pseudonym for Polybius
    D. Polybius antedated Livy
    E. Livy wrote about Polybius

28. Which of the following statements accurately reflects the view of the author?
    A. It is wrong to attempt to reconstruct the history of a past era from ancient documents and accounts.
    B. There is always a tendency to judge the events and people of the past with a derogatory attitude.
    C. A writer of one era is always influenced by his or her own time when writing of another.
    D. It is impossible to reconstruct past events on the basis of documents and journals.
    E. Historians are always suspect in their motives.

29. The mention of "the fable of Menenius Agrippa" is put in for the purpose of
    A. showing the author's deep knowledge of Roman history
    B. showing how poorly Livy wrote history
    C. illustrating the differences between expressions of genuine antiquity and reproduction of these expressions by later generations
    D. depicting the ancient Greek approach to history
    E. confusing the issue

30. As compared with German historians, English and French writers
    A. have a much more parochial approach
    B. have a more cosmopolitan view
    C. are far more personal in their approach to history
    D. are generally much less learned in scholarship and research
    E. are hypercritical of other historians

Passage 7

In Athens a vital freedom existed, and a vital equality of manners and mental culture; and if inequality of property could not be avoided, it nevertheless did not reach an extreme. Together

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with this equality, and within the compass of this freedom, all diversities of character and talent and all variety of idiosyncrasy could assert themselves in the most unrestrained manner and find the most abundant stimulus to development in its environment; for the predominant elements of Athenian existence were the independence of the social units and a culture animated by the spirit of beauty. It was Pericles who originated the production of those eternal monuments of sculpture whose scanty remains astonish posterity; it was before this people that the dramas of Aeschylus and Sophocles were performed, and later on those of Euripides—which, however, do not exhibit the same plastic moral character, and in which the principle of corruption is more manifest. To this people were addressed the orations of Pericles: from it sprang a band of men whose genius has become classical for all centuries; for to this number belong, besides those already named, Thucydides, Socrates, Plato, and Aristophanes—the last of whom preserved entire the political seriousness of his people at the time when it was being corrupted and who, imbued with this seriousness, wrote and dramatized with a view to his country's weal. We recognize in the Athenians great industry, susceptibility to excitement, the development of individuality within the sphere of spirit conditioned by the morality of custom. The blame with which we find them visited in Xenophon and Plato attaches rather to that later period when misfortune and the corruption of the democracy had already supervened. But if we would have the verdict of the ancients on the political life of Athens, we must turn not to Xenophon, nor even to Plato, but to those who had a thorough acquaintance with the state in its full vigor—who managed its affairs and have been esteemed its greatest leaders—its statesmen. Among these, Pericles is the Zeus of the human pantheon of Athens. Thucydides puts into his mouth the most profound description of Athenian life on the occasion of the funeral obsequies of the warriors who fell in the second year of the Peloponnesian War. He proposes to show for what a city and in support of what interests they had died, and this leads the speaker directly to the essential elements of the Athenian community. He goes on to paint the character of Athens, and what he says is most profoundly thoughtful, as well as most just and true. "We love the beautiful," he says, "but without ostentation or extravagance; we philosophize without being seduced thereby into effeminacy and inactivity (for when men give themselves up to Thought, they get further and further from the Practical—from activity for the public, for the common weal). We are bold and daring; but this courageous energy in action does not prevent us from giving ourselves an account of what we undertake (we have a clear consciousness respecting it); among other nations, on the contrary, martial daring has its basis in deficiency of culture: we know best how to distinguish between the agreeable and the irksome; notwithstanding which, we do not shrink from perils." Thus Athens exhibited the spectacle of a state whose existence was essentially directed to realizing the beautiful, which had a thoroughly cultivated consciousness respecting the serious side of public affairs and the interests of man's spirit of life, and united with that consciousness, hardy courage and practical ability.

31. Which of the following inferences appears to be correct, on the basis of the selection?
   A. The great creative geniuses of Athens found it difficult to obtain appreciative audiences.
   B. The audiences of ancient Athens were excessively critical of the works of their contemporary artists.
   C. Modern audiences do not really comprehend the works of the ancient Greek playwrights.
   D. A receptive, even though critical, audience tends to encourage the creative genius of artists and writers.
   E. Athens' greatness lay in its leaders.

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32. One would conclude from Thucydides' comments
    A. that Athens was lacking in military enterprise and skill
    B. that the superiority of Athens over other nations came from its prowess in naval warfare
    C. that other nations stood in awe of Athens' intellectual achievements
    D. that the military boldness of other nations frequently stemmed from an insufficiently developed culture
    E. that posterity would recognize the greatness of Athens

33. The author implies that despite the greatness of Athens
    A. its artists were constrained by superstition
    B. there was a huge gulf between the wealthy and the extremely poor
    C. a certain amount of poverty was inevitable
    C. it was a doomed city and a doomed culture
    E. its achievements were never appreciated by its citizens

34. The speech quoted by Thucydides is attributed to
    A. Zeus
    B. Xenophon
    C. Pantheon
    D. Pericles
    E. an anonymous Greek citizen

35. The particular achievement of Aristophanes indicated in the passage is
    A. his great skill as a social satirist
    B. his greatness as a writer of comedies
    C. his political diatribes
    D. the preservation of the political seriousness of the people
    E. his pointing out political corruption among the people

36. The author of this selection would appear to be
    A. a scholar
    B. a political observer
    C. a philosopher
    D. a student of history
    E. all of the above

Passage 8

If we ask, indeed, what human beings add to the world by their presence in it, there is, I should say, only one possible reply: civilisation. Were it not for his ability to civilise, man would be no more than a predator among the rest, more powerful, more aggressive, more violent, more skillful in capturing his prey but in no other respects superior, and in many respects inferior, to the prey he hunts. And man's great memorials—his science, his philosophy, his technology, his architecture, his countryside—are all of them founded upon his attempt to under-

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stand and subdue nature. Through their struggles with nature men have discovered their potentialities and developed those forms of enterprise which constitute their civilisation.

I have included the countryside in the list of man's memorials, because even the landscapes we now so greatly admire—the landscapes of Tuscany or of England or of Kyushu—are largely the creation of human enterprise, of human struggles. When Cowper wrote "God made the country; man made the town," he was simply mistaken. The 18th-century English countryside Cowper knew and loved was largely of human creation. (What god, for that matter, would not be proud of having created 18th-century Bath?) That is what, however obscurely, Hegel and his followers saw, and passed on to the Marxists. It is not merely out of arrogance that men think of themselves as having a "duty to subdue nature"; it is only they who can create. So far, and only so far, they can rightfully claim "dominion over nature."

Nor, however implausible the doctrine that nature exists only to serve man, is there any objection to the weaker view (to which Descartes subscribed) that whatever exists in nature is of some use to us. This is not, as it might at first seem to be, an empirical hypothesis, for there is no way of falsifying it. It always remains possible that something will turn out to be useful which we have cast aside as useless. But it can act as a guiding principle, encouraging men to look for uses in unexpected places, discouraging the destruction of what might eventually turn out to be of vital importance to them. In that form, it should certainly not be cast aside as "rubbish."

37. According to the author, an empirical hypothesis is one that
    A. was stated most effectively by Descartes
    B. is universally true
    C. may be argued several ways at once
    D. may be proved false
    E. is impossible to define

38. Which of the following statements may be inferred from the passage?
    A. Bath was an eighteenth-century English countryside known for its beauty.
    B. Cowper was an English writer who lived during the eighteenth century.
    C. Hegel was proud of having created Bath and other places.
    D. This is a Marxist analysis of the countryside.
    E. The author is an Englishman.

39. According to the author,
    A. man's great technical and scientific achievements stem from a need and a desire to subdue nature
    B. man's mastery of the world comes from his natural superiority over all other animals
    C. man is only one of several animals on earth capable of great creativity
    D. man casts aside, in his development, only those things which have no potential value
    E. man's impulse to civilization is only one of the many aspects of man that sets him apart from other beasts

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40. The author's attitude toward the countryside is that
    A. it was part of God's handiwork and can only be desecrated by man
    B. "God made the country; man made the town"
    C. a lovely countryside compensates for the ugliness of the city
    D. it is as much a part of man's creation as the town
    E. it is a source of much that is useful for man

Passage 9

It is becoming increasingly difficult to discuss highly controversial ideas on the American campus. There is no better example of this than the controversy surrounding the work of professors Jensen, Herrnstein, Bronfenbrenner, Eysenck, and Shockley. Each of these scholars has been in some way harassed by those opposed to what they think are his ideas. In 1972, when Professor Bronfenbrenner spoke at Boston University, a mob demanded that he recant his former errors. In a scene reminiscent of a Moscow purge trial, he obliged. Last spring Professor Eysenck was physically assaulted at a lecture, and at one major university after another—most recently at Yale—Shockley has been at the last minute denied a platform. The argument employed by those who would silence these scholars has been generally that they are "racists," and that racist ideas are impermissible. A sophistication of this argument has recently come from Professor Charles Isaacs of Staten Island Community College. He tells us that there should be no right to debate when truth is known, and that the truth is that racism—which he dogmatically identifies with Jensen's and Shockley's alleged intelligence differential—is wrong. Racism as the expression of prejudice and persecution directed toward racial groups certainly is wrong. But just as wrong is Isaacs' prejudice against and persecution of those engaged in the open, unimpeded search for truth on controversial subjects, which he seems to fear more than respect. One wonders what Isaacs would say if Shockley claimed that Isaacs had shown himself to be an intellectual storm trooper who ought to be hounded out of the profession. When one denies free speech to others, how shall one retain it for oneself?

41. The author's purpose in writing this selection is to
    A. illustrate intolerance on the American campus
    B. warn against the dangers of infringing on the right to free speech
    C. support the views of Professor Charles Isaacs
    D. defend the views of Jensen and Shockley
    E. condemn student unrest on the campuses

42. Which of the following statements is *not* borne out by the text?
    A. The discussion of controversial subjects is sometimes difficult in American universities.
    B. The question of academic freedom is still very much alive.
    C. Fortunately, there has been no physical harassment of controversial lecturers.
    D. There have been scenes reminiscent of foreign trials and purges.
    E. Persecution of groups for racial reasons is wrong.

43. A summation of Professor Isaacs' position would be
    A. the truth must always be sought out and published
    B. all questions are subject to debate and discussion
    C. there is no debate when one party is wrong
    D. there is no debate when the truth is known
    E. to debate professional matters openly is not sensible

READING COMPREHENSION ANSWER SHEET

Answer each question by placing an 'X' through the corresponding letter. Write only on this page.

PASSAGE 1

1. A B C D E
2. A B C D E
3. A B C D E
4. A B C D E

PASSAGE 2

5. A B C D E
6. A B C D E
7. A B C D E
8. A B C D E
9. A B C D E

PASSAGE 3

10. A B C D E
11. A B C D E
12. A B C D E
13. A B C D E

PASSAGE 4

14. A B C D E
15. A B C D E
16. A B C D E
17. A B C D E
18. A B C D E
19. A B C D E
20. A B C D E

PASSAGE 5

21. A B C D E
22. A B C D E
23. A B C D E

PASSAGE 6

24. A B C D E
25. A B C D E
26. A B C D E
27. A B C D E
28. A B C D E
29. A B C D E
30. A B C D E

PASSAGE 7

31. A B C D E
32. A B C D E
33. A B C D E
34. A B C D E
35. A B C D E
36. A B C D E

PASSAGE 8

37. A B C D E
38. A B C D E
39. A B C D E
40. A B C D E

PASSAGE 9

41. A B C D E
42. A B C D E
43. A B C D E

MAP NAMING TASK--STATES AND COUNTRIES

Use the abbreviation of the name to write the state / country in the appropriate place on each map. Fully complete each map. Then go to the next.

MAP 1

1. Alabama-AL
2. Arizona-AZ
3. Arkansas-AR
4. California-CA
5. Colorado-CO
6. Connecticut-CT
7. Delaware-DE
8. Florida-FL
9. Georgia-GA
10. Idaho-ID
11. Illinois-IL
12. Indiana-IN
13. Iowa-IA
14. Kansas-KS
15. Kentucky-KY
16. Louisiana-LA
17. Maine-ME
18. Maryland-MD
19. Massachusetts-MA
20. Michigan-MI
21. Minnesota-MN
22. Mississippi-MS
23. Missouri-MO
24. Montana-MT
25. Nebraska-NE
26. Nevada-NV
27. New Hampshire-NH
28. New Jersey-NJ
29. New Mexico-NM
30. New York-NY
31. North Carolina-NC
32. North Dakota-ND
33. Ohio-OH
34. Oklahoma-OK
35. Oregon-OR
36. Pennsylvania-PA
37. Rhode Island-RI
38. South Carolina-SC
39. South Dakota-SD
40. Tennessee-TN
41. Texas-TX
42. Utah-UT
43. Vermont-VT
44. Virginia-VA
45. Washington-WA
46. West Virginia-WV
47. Wisconsin-WI
48. Wyoming-WY

MAP 11

1. Albania-AL
2. Austria-AU
3. Belgium-BE
4. Bulgaria-BU
5. Czechoslovakia-CZ
6. Denmark-DE
7. England-EN
8. East Germany-EG
9. Finland-FI
10. France-FR
11. Greece-GR
12. Hungary-HU
13. Ireland-IR
14. Italy-IT
15. Luxembourg-LU
16. The Netherlands-NE
17. Norway-NO
18. Poland-PO
19. Portugal-PR
20. Rumania-RU
21. Spain-SP
22. Sweden-SW
23. Switzerland-SI
24. West Germany-WG
25. Yugoslavia-YU

MAP 111

1. Argentina-AR
2. Bolivia-BO
3. Brazil-BR
4. Chile-CH
5. Colombia-CO
6. Ecuador-EC
7. French Guiana-FG
8. Guyana-GU
9. Paraguay-PA
10. Peru-PE
11. Surinam-SU
12. Uruguay-UR
13. Venezuela-VE

MAP 1V

1. Belize-BE
2. Costa Rica-CR
3. El Salvador-ES
4. Guatemala-GU
5. Honduras-HO
6. Nicaragua-NI
7. Panama-PA

MAP V

1. Algeria-AL
2. Angola-AN
3. Benin-BE
4. Botswana-BO
5. Burundi-BU
6. Cameroon-CA
7. Central African Republic-CAF
8. Chad-CH
9. Congo-CO
10. Djibouti-DJ
11. Egypt-EG
12. Ethiopia-ET
13. Gabon-GA
14. Gambia-GM
15. Ghana-GH
16. Guinea-GU
17. Guinea-Bissau-GB
18. Ivory Coast-IC
19. Kenya-KE
20. Lesotho-LE
21. Liberia-LI
22. Libya-LB
23. Malawi-MA
24. Mali-ML
25. Mauritania-MU
26. Morocco-MO
27. Mozambique-MZ
28. Namibia(SW Africa)-NA
29. Niger-NI
30. Nigeria-NG
31. Senegal-SE
32. Sierra Leone-SL
33. Somalia-SO
34. South Africa-SA
35. Sudan-SU
36. Swaziland-SW
37. Tanzania-TA
38. Togo-TO
39. Tunisia-TU
40. Uganda-UG
41. Upper Volta-UV
42. Zaire-ZA
43. Zambia-ZM
44. Zimbabwe-ZI

MAP V1

(OVER)

MAP V1

1. Afghanistan-AF
2. Bahrain-BA
3. Egypt-EG
4. Iran-IR
5. Iraq-IR
6. Israel-IS
7. Jordan-JO
8. Kuwait-KU
9. Lebanon-LE
10. North Yemen-NY
11. Oman-OM
12. Pakistan-PA
13. Qatar-QA
14. Saudi Arabia-SA
15. South Yemen-SY
16. Syria-SY
17. Turkey-TU
18. United Arab Emerates-UAE

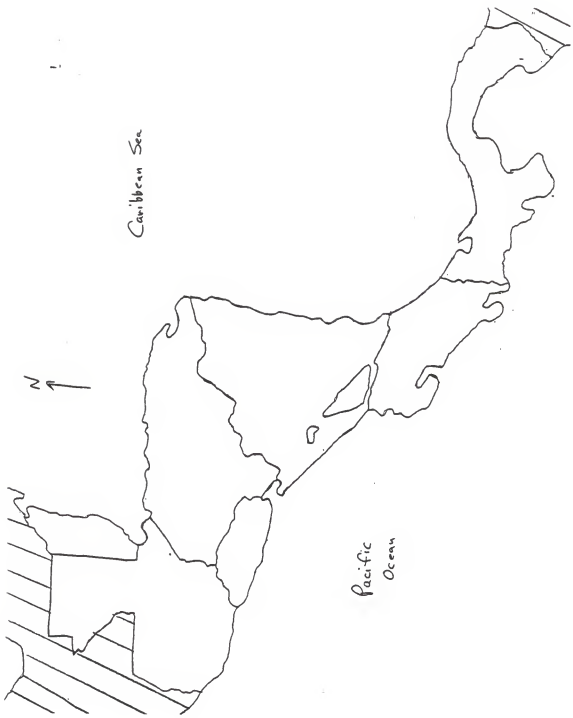
MAP NAMING TASK--MAPS

MAP 1

MAP 2

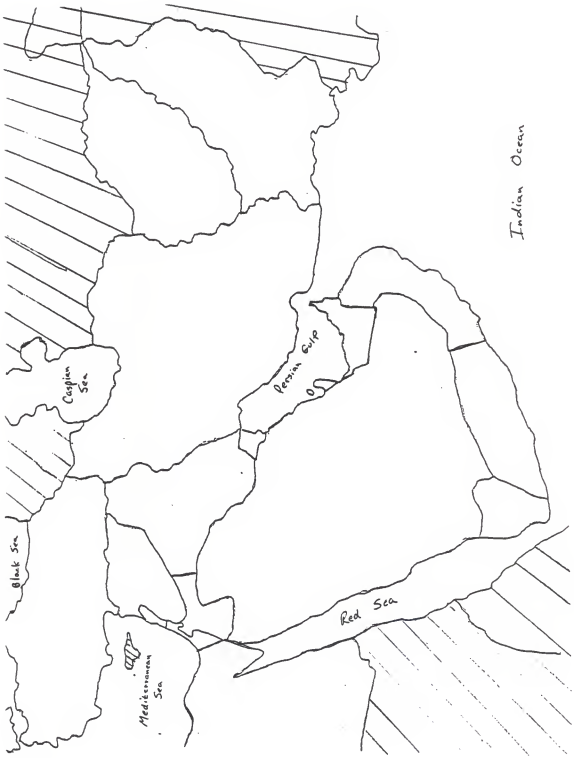
MAP 3

MAP 4



MAP 5

MAP 6


Indian Ocean
Caspian Sea
Persian Gulf
Black Sea
Mediterranean Sea
Red Sea

ALGEBRA SKILLS TASK

Answer the equations from one to 212 in order. Do not leave any blank, and work as carefully as possible. Write the answers legibly in the space to the right of each equation.

1. 11+13=___
2. 5x12=___
3. 45-13=___
4. 63 / 9=___
5. (8+5)x(4+2)=___
6. 23+14+52=___
7. 34+12=___
8. 14x7=___
9. 74-46=___
10. 91 / 7=___
11. (5+7)x(3+6)=___
12. 31+64+84=___
13. 17+15=___
14. 6x9=___
15. 31-28=___
16. 54 / 6=___
17. (2+8)x(8+5)=___
18. 76+55+69=___
19. 10+63=___
20. 8x3=___
21. 97-58=___
22. 24 / 3=___
23. (9+5)x(4+7)=___
24. 12+37+81=___
25. 27+46=___
26. 17x4=___
27. 24-11=___
28. 36 / 4=___
29. (2+3)x(7+8)=___
30. 53+45+22=___
31. 33+19=___
32. 2x13=___
33. 88-59=___
34. 72 / 8=___
35. (6+1)x(5+3)=___
36. 76+31+39=___
37. 24+54=___
38. 3x6=___
39. 72-48=___
40. 63 / 9=___
41. (7+9)x(3+4)=___
42. 82+21+34=___
43. 99+15=___
44. 16x8=___
45. 41-19=___
46. 27 / 3=___
47. (3+2)x(9+5)=___
48. 36+57+74=___
49. 12+17=___
50. 7x10=___
51. 54-38=___
52. 42 / 6=___
53. (8+8)x(7+1)=___
54. 42+83+17=___

55. 45+68=___
56. 15x2=___
57. 95-26=___
58. 58 / 2=___
59. (5+2)x(4+2)=___
60. 78+15+46=___
61. 72+41=___
62. 18x5=___
63. 39-15=___
64. 39 / 13=___
65. (6+3)x(2+5)=___
66. 66+38+29=___
67. 28+45=___
68. 4x14=___
69. 47-31=___
70. 45 / 3=___
71. (7+1)x(6+6)=___
72. 81+72+63=___
73. 18+73=___
74. 12x3=___
75. 62-27=___
76. 66 / 22=___
77. (2+2)x(9+9)=___
78. 59+68+77=___
79. 59+78=___
80. 7x15=___
81. 76-21=___
82. 48 / 8=___
83. (6+5)x(7+2)=___
84. 43+28+57=___
85. 34+44=___
86. 13x6=___
87. 81-18=___
88. 75 / 5=___
89. (1+1)x(6+3)=___
90. 72+68+49=___
91. 14+25=___
92. 3x4=___
93. 55-42=___
94. 98 /14=___
95. (8+6)x(5+1)=___
96. 23+53+98=___
97. 82+11=___
98. 8x7=___
99. 68-44=___
100. 12 / 6=___
101. (9+2)x(7+2)=___
102. 73+76+33=___
103. 78+43=___
104. 9x9=___
105. 32-17=___
106. 44 / 2=___
107. (4+6)x(8+9)=___
108. 16+24+61=___
109. 64+38=___
110. 4x8=___
111. 73-64=___
112. 51 / 17=___

113. (3+5)x(4+4)=___
114. 84+36+21=___
115. 91+50=___
116. 7x9=___
117. 45-33=___
118. 72 / 6=___
119. (6+2)x(4+3)=___
120. 51+41+71=___
121. 52+23=___
122. 14x5=___
123. 89-71=___
124. 80 / 16=___
125. (3+3)x(9+7)=___
126. 33+55+77=___
127. 39+16=___
128. 11x3=___
129. 71-49=___
130. 81 / 9=___
131. (8+4)x(5+2)=___
132. 41+38+94=___
133. 36+74=___
134. 6x12=___
135. 22-13=___
136. 64 / 4=___
137. (9+5)x(6+6)=___
138. 19+16+28=___
139. 67+19=___
140. 8x18=___
141. 60-47=___
142. 96 / 12=___
143. (1+7)x(6+8)=___
144. 99+39+69=___
145. 18+84=___
146. 19x4=___
147. 93-69=___
148. 56 / 4=___
149. (5+5)x(3+7)=___
150. 45+62+37=___
151. 45+54=___
152. 17x6=___
153. 56-41=___
154. 34 / 2=___
155. (8+7)x(6+8)=___
156. 10+25+73=___
157. 94+32=___
158. 3x13=___
159. 37-19=___
160. 18 / 3=___
161. (2+4)x(7+7)=___
162. 52+31+68=___
163. 80+60=___
164. 4x16=___
165. 48-36=___
166. 54 / 18=___
167. (3+1)x(2+9)=___
168. 22+44+66=___
169. 22+77=___
170. 15x7=___

171. 80-55=___
172. 57 / 19=___
173. (6+7)x(4+5)=___
174. 36+58+41=___
175. 79+15=___
176. 10x5=___
177. 42-14=___
178. 77 / 7=___
179. (5+3)x(1+4)=___
180. 92+84+75=___
181. 122+235=___
182. 21X14=___
183. 264-88=___
184. 144 / 18=___
185. (6+7)X(8+5)=___
186. 69-13-48=___
187. 356+689=___
188. 38X49=___
189. 749-372=___
190. 182 / 26=___
191. (9+8)X(5+9)=___
192. 87-26-43=___
193. 561+479=___
194. 83X54=___
195. 501-243=___
196. 156 / 13=___
197. (7+9)X(8+9)=___
198. 95-56-24=___
199. 384+747=___
200. 36X28=___
201. 264-78=___
202. 186 / 31=___
203. (5+3)X(7+4)=___
204. 54-13-29=___
205. 987+345=___
206. 37X62=___
207. 845-476=___
208. 544 / 16=___
209. (8+5)X(6+9)=___
210. 67-38-19=___
211. 624+877=___
212. 74X96=___

APPENDIX 3

QUESTIONNAIRES

ID#____

TASK: RC MN AS
GROUP: 1 2 3
TAPE: Y N

DISTRACTION QUESTIONNAIRE

Answer each question as best as you can. Do not go to the next page until you have finished this one. Once you have finished this page you are not allowed to come back to it so make sure you have answered the questions as best as you can.

1. How difficult do you think the task was?
   - __ Easy
   - __ More easy than difficult
   - __ More difficult than easy
   - __ Difficult

2. How well do you think you did on your paper-and-pencil task?
   - __ 100-90% Correct
   - __ 89-80%
   - __ 79-70%
   - __ 69-60%
   - __ 59-50%
   - __ 49-40%
   - __ Below 40% correct

3. How aware were you of the background radio program?
   - __ Highly aware
   - __ More aware than unaware
   - __ More unaware than aware
   - __ Mostly unaware

4. How much do you feel the radio prevented you from performing your task to the best of your ability?
   - __ Very much
   - __ Somewhat
   - __ A little
   - __ Not at all

5. Below are listed other items than songs commonly heard on radio programs. Rate them from 1 to 5 as to how confident you are that you did or did not hear them while doing your task. 1 being certain you did not hear it to 5 being completely certain you did, with 3 being uncertain either way.
If possible, describe in detail as much as you can about the ones you rated 4 or 5 in the space beside and below the items (For example, male or female voice, music in the background, content of information, names or places mentioned)

CERTAIN DID NOT HEAR UNCERTAIN CERTAIN DID HEAR

1 2 3 4 5

__ Commercial(s)

__ Public Service Announcement(s)

__ Newscast

__ Sportscast

__ Weather report

__ Stock Market report

__ Time and Temperature

__ Station Identification

6. Some of the following songs were played over the program you just heard. Rate as to how confident you are that you did or did not hear that song on a scale of 1 to 5. 1 being certain you did not hear it to 5 being certain that you did hear it.

CERTAIN DID NOT HEAR UNCERTAIN CERTAIN DID HEAR

1 2 3 4 5

___ Cool and the Gang: Fresh
___ Pat Benatar: Love is a battlefield
___ Huey Lewis and the News: The power of love
___ Cyndi Lauper: All through the night
___ Mr. Mister: Broken wings
___ John Cougar Mellencamp: Lonely ol' night
___ The Cars: Hello again
___ John Cafferty/Eddie and the Cruisers: On the dark side
___ Aretha Franklin: Who's zoomin' who
___ Sheena Easton: Sugar walls
___ Whitney Houston: Thinking about you
___ Chicago: Hard habit to break
___ Hall and Oats: Head above waters
___ Phil Collins/Marilyn Martin: Separate lives
___ Honey Drippers: Sea of love
___ Sting: Fortress around your heart
___ Klymax: I miss you
___ Bruce Springsteen: I'm on fire
___ ZZ Top: Party on the patio
___ Billy Joel: The night is still young
___ Survivor: High on you
___ Philip Bailey: Woman
___ Bryan Adams: I need somebody
___ Lionel Richie: Hello
___ Madonna: Crazy for you
___ Other:_____

7. Several commercials were also presented in the radio format. Again, rate the ones you think you did and did not hear, on the same scale of one to five. Also, write the name of the item or service advertised if you can and the number of times you heard it out to the side.

CERTAIN DID NOT HEAR — UNCERTAIN — CERTAIN DID HEAR

1 2 3 4 5

	NAME	#
___	A soap commercial	
___	A house cleaning service commercial	
___	A bookstore commercial	
___	A reading comprehension class commercial	
___	A face cream commercial	
___	A restaurant commercial	
___	A sweepstakes commercial	
___	An office supplies commercial	
___	A math tutoring program commercial	
___	An airline commercial	
___	A community recreational services commercial	
___	An appliance store commercial	
___	A copy service commercial	
___	A dog obedience training school commercial	
___	An auto repair shop commercial	
___	A furniture and waterbed store commercial	
___	A toothpaste commercial	
___	An automobile dealer commercial	
___	A shampoo commercial	
___	A grocery store commercial	
___	A legal services commercial	
___	A clothing store commercial	
___	An academic research service commercial	
___	A crisis counselling center commercial	
___	A travel bureau commercial	
___	A gum commercial	
___	An accounting and tax service commercial	
___	An learning dynamics course commercial	
___	An employment service commercial	
___	Other	

ID#____

RADIO LISTENING HABITS QUESTIONNAIRE

AGE ___ YEAR: FR SO JR SR SEX: M F

1. On the average, how many hours per week would you estimate you listen to the radio?

___ 0-3 ___ 10-12 ___ more than 18 hrs/wk
___ 4-6 ___ 13-15
___ 7-9 ___ 16-18

2. What kind of radio music do you like to listen to most? Give first (1), second (2), and third (3) choice.

___ Classical
___ Contemporary Religious
___ Contemporary "Top 40"
___ Country and Western
___ Fifties/Sixties Rock
___ Easy Listening Contemporary
___ "Beautiful" Music
___ Heavy Metal
___ Jazz
___ New Wave/Punk Rock
___ Religious/"Gospel"
___ Other_____

3. What kind of radio programs do you listen for most?

___ Music ___ Weather
___ Talk Shows ___ Sports
___ News ___ Other _____

4. Name the five most common activities you do with radio music playing in the background (You may put from 0-5 activities).

5. Do you listen to the radio while doing school work?

___ Always
___ Quite often
___ Often
___ Occassionally
___ Seldom
___ Never

6. Name five commercials (products or services) you have heard on the radio in the past three months?

7. Please share on the back of this sheet your comments on the influence you think radio advertising has on your purchasing behavior (how does radio advertising affect you).

ATTENTION TO RADIO ADVERTISEMENTS: AN APPLICATION OF SELECTIVE ATTENTION THEORY

by

JOHN IVAN BECHTOLD

B.S., Wheaton College, 1980
M.S., Kansas State University, 1983

AN ABSTRACT OF A MASTERS THESIS

submitted in partial fulfillment of the

requirements for the degree

MASTER OF SCIENCE

Department of Psychology

KANSAS STATE UNIVERSITY
Manhattan, Kansas

1986

ABSTRACT

The study explores whether certain radio advertisements are selectively attended to based upon the type of task an individual is doing. Subjects were 126 General Psychology undergraduate students assigned to one of three different tasks: reading comprehension, algebra skills, and map naming. Three taped radio commercials embedded in a music format were created to correspond to each of the paper-and-pencil tasks (a reading comprehension class commercial, a math skills tutoring program commercial, and a travel bureau commercial). Subjects were to complete one of the tasks with the taped radio program playing in the background, thinking that it was a distraction study on the effects of radio on performance. Data was collected from the subjects to see if the task performed related to a greater ability to recall or recognize the target commercial as opposed to the other commercials. Results showed that subjects in only one of the tasks rated their memory for the target commercials in the expected direction. Conclusions were drawn as to the possible related factors and the improvements which could be made concerning the research.